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***IRRIGATION MANAGEMENT TRANSFER AND
TRANSFER OF ASSETS AND PHYSICAL
INFRASTRUCTURE:***

A REVIEW AND RECOMMENDATIONS

Report No. 61

May 2002

Water Policy Program
International Resources Group Winrock International Nile Consultants

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A REVIEW AND RECOMMENDATIONS

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Executive Summary

Many governments assume that the transfer of management responsibility to farmer organizations will improve the accountability of the irrigation service to farmers, make the service more cost-efficient, motivate farmers to invest more in maintaining irrigation systems and, ultimately, make irrigation systems and irrigated agriculture more sustainable.

The present survey revealed that most countries that report to transfer of physical infrastructure assets, are doing so largely at the tertiary level. It should be stressed from the outset, that in Egypt, ownership of tertiary (i.e. mesqa-level) assets has been the purview of water users for generations. Only a few countries have pursued transfer of physical assets at levels above the tertiary, e.g. laterals, branch canals or main systems.¹

The GOE transfer of major management responsibilities for sections of the irrigation system above the *mesqa*-level to stakeholders and/or the private sector is a bold advance toward the goal of participatory management and privatization of the irrigation system. (Since many decades Egyptian farmers at the tertiary level of the irrigation system have held primary responsibility for mesqa-level operations). Although higher-level systemic IMT is now a major feature of irrigation delivery in several other countries, it is only now being launched in Egypt.

With transfer of responsibilities, the profile of the GOE in water management can be expected to change significantly, although there will likely continue to be a need for a sustained policy and regulatory role for the GOE. There is also expected to be a rationalization of the respective roles of government and users in water management.

In December 2000, MWRI promulgated the following policy statement, with twenty policy clauses detailing procedures and processes:

In a phased process of application, the MWRI will transfer selected sub-sections of Egypt's irrigation and drainage network to users and/or the private sector acting on behalf of the users.

The MWRI recognizes that IMT transferring process is not under the purview of any one agency of the MWRI. The Irrigation Department, the Drainage Authority, and the Mechanical & Electrical Department are the major agencies within MWRI to implement, support and coordinate the transfer process. The Office of the Minister provides overall policy guidelines and performance tracking through the *IMT Steering Committee*, and the Irrigation Advisory Service (IAS) has the lead in coordinating IMT programs at the field level, with an assigned liaison officer to each of the main line departments.

¹ cf. the following definitions: a) Tertiary level refers to on-farm off-takes, such as mesqas and tile drains; b) Secondary level refers to Branch Canals and Drainage Laterals that deliver irrigation water or carry drainage water into the drainage system. (In some instances, e.g. Ismailiya Main Canal, there are main branch canals feeding into smaller branch canals and finally, down to the tertiary level); c) Main level refers to main public canals directly off the Nile River, or primary drains that flow into the sea or other terminal points.

It was decided there was a need for alternative methods of financing expansion of the IMT pilot program nationwide, including public/private co-financing, establishment of a Water Partnership Fund, and government loan mechanisms to bring MWRI, private sector entities and NGOs together in a cooperative effort. An element of this last resolution was consideration of a flexible transfer modality, one that might include transfer of asset ownership status. The present effort approaches this topic, first in view of experiences from other countries where transfer of assets to users has taken place, and models that are deemed appropriate for the Egyptian context.

This study differentiates between transfer and management participation, and transfer and infrastructure ownership. The benefits for this increased participation include lower financial burden on government, increased farmers' sense of ownership, and lower costs and improved system management. Disincentives for this participation are identified as a reluctance to take on what farmers believe is the government's responsibility, recognition that many systems need rehabilitation before transfer, and a need for costly and labor-intensive capacity building of WUAs.

It is recognized that implementation of ownership transfer effort would need to be undertaken in incremental steps, moving from pilot to program levels, and continually evaluating and assessing the impact and results. The complexities of Egypt's water delivery network requires that consideration be given to the various categories of system, e.g. new lands vs. old lands, gravity vs. lift systems, in addition to areas where conjunctive use and drainage water reuse are prevalent. The following figures indicate the scale of the challenge faces in this arena: 1) Irrigation Network – a. main public canals 13,000 km, b. secondary public canals (branch canals) 19,000 km, and c. tertiary private watercourses (*mesqas*) 100,000 km. Drainage Network – a. main drains 17,500 km, b. open secondary drains 4,500 km, and c. covered secondary & tile drains 250,000 km. Together, these systems service a command of about 7.4 million feddans.

Only a few countries are presently extending management transfer to medium and large-scale irrigation systems beyond the tertiary level, and among these, even fewer are transferring ownership of physical infrastructure to the private sector. Frequently IMT programs are shown to lack strategic planning involving all stakeholders. Strategic planning mechanisms have the potential to enable identification of new agency mandates and minimize disruptive issues such as government staff displacement. Identification of new roles for irrigation agencies after turnover, such as regulatory enforcement, water basin management and environmental regulation, can help limit agency resistance to transfer programs. In the examples examined in this review, WUAs were created, training was provided and physical repairs were made in conjunction with transfer. Transfer involved negotiation and agreements between the agency and water users in each case.

This study revealed that many countries are implementing IMT policies at the tertiary level only. Egypt long ago transferred tertiary level ownership to users and is focused now on considerations for secondary level transfer mechanisms.

Time constraints did not allow for a comprehensive review of all literature available from all the countries that have reported on IMT experiences. For the purpose of this study documentation was examined from Argentina, Nepal, The Philippines, Senegal, Sri Lanka, the United States, Tunisia, Colombia, Mexico, South Africa, India, New Zealand, Japan, Chile Taiwan and China.

In only a few cases did infrastructure ownership transfer above the tertiary level to private sector receiving entities (United States, China, Colombia, Taiwan). For Egypt, among the most significant results of higher-level infrastructure ownership transfer are from 1) the western US states, where transfer included water rights, legal status for water districts, formal service agreements between the government, districts and users, full transfer of authority for district finances, O&M and rehabilitation, and removal of government staff from the districts and strong capacity to impose incentives and sanctions to ensure accountability; 2) Colombia, where perceived increased operational efficiency following ownership transfer and establishment of localized control units under the managerial aegis of the WUA became apparent, 3) Mexico, where with the new system of management, the irrigation system is controlled by three main entities: Irrigation units (or WUAs, *modulos*) for small scale schemes, and run by farmers, Irrigation Districts for large scale schemes (> 3,000 ha), and run by the state, and completely private irrigation schemes. Whereas, most countries have been able to introduce transfer of smaller systems to users, Mexico, instead stressed turnover of large-scale systems; 4) South Africa, where water services, after transfer, are self-financing at local and regional levels. The infrastructure is transferred to local government once the systems are fully operational and capacity at local level is realized; 5) New Zealand, which is one of the very few countries to engage in large-scale privatization of the irrigation scheme assets, introduced removal of all subsidies for irrigation, including selling the schemes to users to increase the efficiency of their operation. Some of the institutional mechanisms used to promote this transformation include: direct sale to irrigators, sale to state-owned enterprise, sale to local government, and sale to other private parties, giving highest priority to irrigators, and to maximize the efficient use of irrigation assets and water resources. Private sector financing was made available through the banking system and there have been no major problems with the transfer process; and 6) China, where the IMT policy has been to transfer management and branch canal/lateral infrastructure non-profit utilities called *Self-financing Irrigation and Drainage Districts (SIDDs)*. The SIDDs sell water on to local Water User Associations, which take responsibility for allocation, fee collection, and operation and maintenance in their areas.

It is the conclusion of this study that for the present time, the MWRI is in an excellent position to consider infrastructure transfer in new and lands. Given the major costs and the limited resources available, it is logical and responsible to expect these areas to be most receptive and ultimately, successful in the short-run. Reclaimed land schemes (both old and new) should be given priority for ownership transfer. The two recently established holding companies for North Sinai, Toshka and Western Delta would be an opportune launching pad for the process. “Old lands” and their corresponding infrastructure should be developed in a progressive manner until the concept of *Integrated Water Management District* that would be eventually transferred to users is realized. Other areas that would be suitable candidates are located on the fringes or the extension of the eastern and western Delta and the Nile Valley (e.g. El-Salaam Canal Project, the Salheya Shabab projects, Western Nubareya, and Northern Coastal Roads region, and Toshka Project in upper Egypt). Due to the complexity of the system, predominance of fractionalised landholdings, prevailing social and cultural conditions in the old land of Nile Delta and Nile Valley, the transfer would be best likely limited for the foreseeable future to turn-over for O&M responsibilities.

The present document concludes with description of a strategic model to be applied in new, old-new and later in old lands, and based on the results ascertained from reports and studies in several other countries. It is recommended that MWRI will transfer management of irrigation facilities to the concerned BCWUA according to a negotiated mutually agreed time frame and plan of action, ranging from 2 to 4 years, depending on internal capabilities. On full system implementation, the role of the MWRI would shrink to offering a BCWUA some technical support, perhaps even on a fee for services basis. Otherwise, after a 3-year apprenticeship under MWRI tutelage, a BCWUA achieves and demonstrates full capability in managing and sustaining its irrigation facilities. To support the process and strengthen the capability of farmers to manage their infrastructure market-based initiatives for creation of sideline businesses related to irrigated agriculture need to be developed. (Private irrigation districts in the US, New Zealand, Mexico have been able to defray major O&M costs through this mechanism.) Under this proposed methodology, the Feasibility Study Phase begins with a Community Orientation activity, which presents the proposed concept of transfer to the target community. The Detailed Design Phase follows the Feasibility Study Phase. The Detailed Design Phase culminates in a Memorandum of Understanding (MOU), which MWRI and concerned BCWUAs sign in order to document a mutual understanding of the nature and scope of the subproject including the BCWUA commitment to its equity share contribution. The Detailed Design Phase is expected to last about 6 months, again depending on local exigencies and technical requirements. The duration of the Construction Phase may be highly variable, depending on the size of the system and the complexity of the works involved. The final phase of SMOTE is System Management and Agricultural Development. This phase may last for up to 3 years from the end of construction and the commissioning of the works. During the System Management and Agricultural Development Phase the IAS will support each BCWUA through an apprenticeship program of on-the-job training in management of the irrigation system. Physical Systems Transfer is the milestone that recognizes the BCWUA as a viable organization. We anticipate Systems Transfer at approximately 6 years after commencement of the system feasibility study. At that point, the BCWUAs sharing a system should have demonstrated their managerial capabilities and should be exercising their O&M responsibilities satisfactorily. MWRI can then transfer management responsibility as well as physical assets to BCWUAs or federations as appropriate. Following Systems Transfer all categories of beneficiaries will have to set their own fee structure internally so that they are ready to cover the costs of emergency repairs in addition to the costs of routine O&M. They will also have to make provision for collection of the fees that they set. MWRI will remain a source of technical assistance and follow-up training but the BCWUA will otherwise take full charge over day-to-day operations of the system.

This present review discusses the various approaches that have been carried out in a number of countries with respect to infrastructure transfer, and presents some of the initial findings and results as reported anecdotally by national implementation and/or funding agencies. With specific reference to Egypt, the report presents a suggested model for pilot implementation, indicating expected benefits and incentives to the stakeholders. Finally, this document asks some pertinent questions about what role MWRI will play in water resource management after transfer of physical ownership to the private sector.

List of Abbreviations and Acronyms

APRP	Agricultural Policy Reform Program
BCWUA	Branch Canal Water User Association
EPADP	(MWRI) Egyptian Public Authority for Drainage Projects
EPIQ	Environmental Policy and Institutional Strengthening Indefinite Quantity Contract
EWUP	Egypt Water Use Project
GOE	Government of Egypt
HCDWI	Head of the Central Directorate for Water Resources & Irrigation (MWRI)
HEPS	(MWRI) Horizontal Expansion & Projects Sector
IA	Irrigation Authority
IAS	Irrigation Advisory Service
IDS	Irrigation and Drainage System
IIP	Irrigation Improvement Project
IIS	(MWRI) Irrigation Improvement Sector
IMT	Irrigation Management Transfer
INPIM	International Network on Participatory Irrigation Management
IRG	International Resources Group, Ltd.
ISM	Irrigation Systems Management Project
M&E	Monitoring and Evaluation
MED	(MWRI) Mechanical & Electrical Department
MWRI	Ministry of Water Resources and Irrigation
NWRC	(MWRI) National Water Research Center
O&M	Operation and Maintenance
PAC	Public Awareness Campaign
PIM	Participatory Irrigation Management
PRA	Participatory Rural Appraisal
SMOTE	Strategic Model for Ownership Transfer in Egypt
USAID	United States Agency for International Development
WPAU	Water Policy Advisory Unit
WPRP	Water Resources Results Package
WUA	Water User Association

1. Introduction

1.1 Overview

The Ministry of Water Resources and Irrigation (MWRI) is the primary government agency charged with the management of water resources in Egypt. Escalating population growth, a desire for agricultural expansion, and increasing demands on surface water supply play significant roles in water delivery capability. Both MWRI and USAID are aware of the need to develop policy reform that will effectively address these and other issues that determine utilization efficiency, productivity, and protection of water resources.

During FY 96/97 the MWRI and USAID developed a “water resources results policy package” that focused on producing four major results:

- 1) improved irrigation policy assessment and planning process,
- 2) improved irrigation system management,
- 3) improved private sector participation in policy change, and
- 4) improved capacity to manage the policy process.

The MWRI and USAID designed the water resources results package with the following objectives:

- To increase MWRI’s ability to analyze and formulate strategies and policies related to integrated water supply augmentation, conservation and utilization, and protection of Nile water quality.
- To improve water allocation and distribution management policies for conservation of water while maintaining farm income.
- To recover the capital cost of *mesqa* improvements and establish a policy for the recovery of O&M costs of the main system.
- To increase users' involvement in system O&M.
- To introduce a decentralized planning and decision-making process at the irrigation district level.

In early 1997 the water resources results package was integrated into USAID’s Agricultural Policy Reform Program (APRP). APRP is a broad-based policy reform program involving five GOE ministries (MWRI, Ministry of Agriculture and Land Reclamation (MALR), Ministry of Trade and Supply, Ministry of Public Enterprise, and Ministry of International Cooperation). APRP has the goal of developing and implementing policy reform recommendations in support of private enterprise in agriculture and agribusiness.

USAID supports the MWRI in five program activities under APRP. These five activities are:

1) water policy analyses, 2) water policy advisory unit, 3) water education and communication, 4) main systems management, and 5) Nile River monitoring, forecasting and simulation. USAID supports the Ministry's efforts through technical assistance and cash transfers (annual *tranches*) based on achievement of policy reform benchmarks.

Technical assistance for the water policy analyses is provided through a task order (Contract PCE-I-00-96-00002-00, Task Order 807) under the umbrella of the Environmental Policy and Institutional Strengthening Indefinite Quantity Contract (EPIQ) between USAID and a consortium headed by the International Resources Group, Ltd. (IRG) and Winrock International. Local technical assistance and administrative support is provided through a subcontract with Nile Consultants.

1.2 Purpose of the Report²

Irrigation Management Transfer as reflected in EPIQ Report No. 47 of 2001 encompassed issues related to the transfer of operational and management responsibilities to users and/or the private sector. The issue of transferring ownership of infrastructure above the mesqa level has yet to be addressed in Egypt. It has been reported in several other countries that some of the most successful irrigation transfer schemes were accomplished when ownership transfer of the water delivery infrastructure accompanied the transfer of O&M responsibilities. Few countries have transferred ownership status of physical assets above the tertiary level. This brief study will investigate that supposition and how such ownership transfer above the mesqa level may be applicable in the context of current and proposed aspects of the Egyptian context.

It was not possible, during the short implementation period, to adequately survey materials from all countries where water resource privatization has taken place. Only several countries have been the intensive focus for this study. Documents for Latin American countries, for example, are in either Spanish or Portuguese language, and a number of other documents are in French or languages other than English or Arabic. Therefore a wealth of additional material awaits adequate survey and analysis.

The specific objectives of this activity are to:

- Conduct a brief focused multi-disciplinary survey of irrigation transfer efforts in selected countries (based on available literature and reporting), where infrastructure ownership has remained with governments and also where ownership has been transferred. Report on the varying results.
- Assess the results of the various levels of infrastructure ownership transfer (tertiary intakes, regulators, pump stations, etc.).

² It must be noted that the very short timeframe for this study, i.e. 2 months during which 3 other studies were also carried out by the same EPIQ/MWRI team, has effectively kept this report to a very brief length and prevented the possibility to conduct a level of analysis of greater breadth and range. This report, therefore, is regarded as only a general introduction to the subject.

- Suggest possible models of ownership transfer for MWRI to consider in the future, including roles of the receiving entity (e.g. user associations, municipalities, districts, private water companies, as appropriate).
- Suggest realistic models for ownership transfer in the Egyptian context including social and economic implications, highlighting the pros and cons, and costs and benefits.

2. Background

2.1 Participation in Irrigation Management in Egypt

The Ministry of Water Resources and Irrigation (MWRI) was the pioneer agency in Egypt in conceptualizing and implementing participatory approaches to irrigation. Its successes of the 1980s and 90s through various programs and initiatives, including the EWUP, the IIP and EPADP projects, among others, have remained a point of reference in planning and preparing irrigation development efforts.

In current models of IMT in Egypt, tertiary WUAs finance operations through receipts that are generated from the shareholder membership. The current challenge for MWRI is to identify an approach to secondary level irrigation transfer development and implementation that is manageable given its financial constraints and consequent reduced capabilities while nonetheless addressing national goals of increased food production and reduction of poverty in rural areas. MWRI based its program of development and rehabilitation on two concepts:

- Firstly, farmers have the capacity to manage significant areas of land under irrigation and drainage coverage. When WUAs are empowered to exercise management authority over such areas, local interest in and leadership for such organizations flourish and the capacity of the organization grows; and,
- Secondly, involvement of water users in planning, designing and constructing water management systems promotes satisfaction with physical facilities while building the capacity of irrigation organizations to manage their irrigation systems.

Branch canals function in provide water directly to mesqa outtakes. Mesqas, in turn, are generally pump-lifted water systems. MWRI has adopted participatory methods to implement all communal schemes. The participatory process applies a methodology for user involvement in project implementation from feasibility study through detailed engineering design and construction. MWRI's procedures, nonetheless, have focused on user participation in project development as a mechanism to facilitate capital cost recovery as per the exigencies of Law 213/94 related to water and drainage. Under the IMT model approved by MWRI, a BCWUA is offered limited support for the first period of system operations and maintenance (O&M), during which time the system is rehabilitated to an acceptable standard, and users are provided adequate orientation and training. The present model of secondary-level transfer in Egypt is marked by a transfer of O&M responsibilities, but not ownership of assets/infrastructure above the tertiary level.

The main objective of initiating the participatory approach in Egypt was to improve water use efficiency, better manage water future shortages, and guarantee greater equity among stakeholders. In order to implement this approach it was necessary to ensure that the cost

recovery component of the program and the subsequent management of irrigation facilities were successful and sustainable. MWRI, therefore, introduced a 20-year payback structure that allows users to share in equity cost contribution at the outset and to amortize a share of capital development costs annually for the payback period thereafter.

After the participatory process became a standard component of MWRI development, MWRI launched the approach at the Branch Canal or secondary level of the irrigation system. Essentially, MWRI aimed to alleviate its difficulties in operating and maintaining branch canals, particularly its yearly negative income from O&M. By also launching the participatory program at the secondary level, MWRI hoped to develop the capacity of farmers to carry out O&M through BCWUAs. MWRI could then transfer branch canal system management to BCWUAs and subsequently reduce its own O&M burden. At the same time, by using BCWUAs in non-IIP areas to support growth and development of mesqa WUAs, the government would further reduce its workload and allocation of resources.

MWRI has been responsible for constructing, operating and maintaining branch canals. MWRI covers its O&M costs through a general budgetary allocation from the central government. In the present IMT configuration users do not contribute to capital cost of construction, nor to ongoing or running costs as they do at the tertiary level. Furthermore, MWRI has been responsible for main system O&M. Tertiary mesqas are wholly transferred to WUA management. In addition to communal and national irrigation systems, MWRI plays a role in development and construction of private irrigation systems. Private systems are generally mechanized lift-pump systems.

Concerted efforts of MWRI to organize farmer beneficiaries into secondary level user associations and to develop capacity to manage these sub-systems, started in 1999 when MWRI decided to foster policy reform in this area to build in-house institutional development capability. Ministerial Decree in the year 2000 amended the Law 213 of 1994 and laid the basis for establishing the BCWUA as a legal entity with the power to manage irrigation systems. The decree explicitly authorized MWRI to delegate O&M of branch canals to a BCWUA. It also added to the functions of MWRI supervision of O&M for facilities constructed with government funds. This Ministerial Decree provided the legal basis for the establishment of BCWUAs on a pilot basis. (It is expected that revision of the current GOE laws governing water in Egypt will give broad legal foundation to transfer from government to the private sector).

MWRI employs the IAS to organize BCWUAs. The IAS fields its staff several months prior to project construction work. During this pre-construction period, IAS staff regularly liaise with water users and identify and understand needs and constraints of each particular command area network served. The IAS uses this lead-time in working with water users to:

- gain the confidence and trust of as well as detailed knowledge about the community;
- share information with the community about the project and the need to organize a BCWUA;

- mobilize users to undertake participatory activities for the association;
- enlist users in active participation in planning the irrigation system;
- develop procedures and systems to mobilize users to engage and to participate during project construction; and,
- help to formulate the most appropriate procedures and schedules for user management in O&M.

During this stage a BCWUA develops its capacity as members participate in group actions meant to strengthen their management and leadership skills. Interaction of MWRI staff with a BCWUA continues up to completion and management handover of any one system. At this early stage in the program, it is expected that the IAS will continue to guide BCWUA during the first and second years of operation.

A BCWUA acquires its legal status by registering with the appropriate MWRI Undersecretary of Irrigation. Upon registration the BCWUA acquires the legal personality to transact business with the government, corporations or other legal entities.

2.2 Some Lessons Learned

MWRI closely monitored its participatory IIP program in the early 1980's. It found that its pilot participatory projects performed better than non-participatory mesqas projects in terms of equitable water distribution, higher quality maintenance and more efficient system operations.

In terms of physical infrastructure virtually the only difference between WUAs and BCWUAs is scale. Yet MWRI has been following different practices and procedures in project development and subsequent system management. MWRI has also concluded that development of self-reliant BCWUAs would have to provide for full farmer participation in all phases of the water management project development and management cycle. MWRI has hitherto emphasized participation in sharing of costs and responsibilities with beneficiaries rather than in sustaining the benefits of participation for them. The approach to communal irrigation development facilitates cost recovery through user amortization payments utilizing the provision of the Law 213 twenty-year rehabilitation payback.

The goal of MWRI is to enhance rural incomes and thus reduce the incidence of poverty dramatically among farmers. This goal can be targeted by investing in irrigation infrastructure and supportive activities as a means to increase agricultural production, and by complimentary increases in production with measures to cut costs of sustainable irrigation O&M by promoting increased user participation in service and watershed area development and subsequent transfer of management and assets of all completed irrigation systems to self-reliant BCWUAs.

A consolidated user participation effort has two basic components:

Participation and Transfer – covers development, field-testing, documentation and implementation of a process that will involve user participation in critical feasibility, design and construction decisions and organize them into BCWUAs, build their capacity for sustained O&M and ultimately transfer irrigation systems to them as a way of improving irrigation performance and realizing increases in agricultural production and incomes.

Physical Infrastructure – covers developing or rehabilitating irrigation infrastructure that will command the total service area.

2.3 Transferring Control of Government System to the Private Sector

Governments around the world are attempting to reduce their recurring expenditures on irrigation and stabilize deterioration of scheme infrastructure without sacrificing the productivity of irrigated agriculture. Many governments assume that the transfer of management responsibility to farmer organizations will improve the accountability of the irrigation service to farmers, will make the service more cost efficient, will motivate farmers to invest more in maintaining irrigation systems and ultimately, will make irrigation systems and irrigated agriculture more sustainable. There are substantial differences in strategies, contexts and results among countries. Although IMT is a widespread phenomenon and has the potential to have a large impact on the sustainability of irrigation systems and the productivity of irrigated agriculture, until very recently there has been little knowledge at the international level about what approaches work and do not work in different contexts.

Pros

- Lower financial burden on government
- Increase farmers' sense of ownership
- Lower costs and improve system management

Cons

- Reluctance to take on what farmers believe it's the government responsibility
- Many systems need rehabilitation before transfer
- Need for costly and labor-intensive capacity building of WUA

2.4 Trends in Participatory Irrigation Transfer

The evidence is clearly emerging from a number of studies that ownership transfer of irrigation systems at the terminal level of the system offers the greatest opportunities for success. In some instances, perceived economies-of-scale have determined government procedures and policies regarding the scope and breadth of the transfer process.

The conceptual framework recognizes three types of transfer.

- Management (planning, design, construction, O&M).
- Infrastructure (canals, pumps, control structures) physical works.
- Water rights (use-rights and selling-rights).

Transferring irrigation management to farmers has both “push” (failure of conventional administration) and “pull” (attractions of decentralizing state authority) characteristics. To the extent that these are mutually interdependent variables, a number of countries can cite unique and challenging experiences.

The path of water resource privatization taken by Egypt will depend largely on the ability to understand what is achievable and possible under the conditions and opportunities prevailing in the national context. A major key to success will be the planners’ ability to accurately anticipate the rate at which Egyptian institutions can be adjusted to take on reforms and modifications in responsibility and fiscal control. In looking at the different international experiences in management and ownership, it is apparent that farmers do not always want to maximize their participation in all ways. The data indicate that small farmers sometimes tend to be disinclined to taking over ownership of irrigation system infrastructure, even at the tertiary level of the system. Recognizing their technical and/or financial limitations these small farmers often prefer to have governments remain partly involved in regulating management to help regulate conflict and provide technical managerial support. From the perspective of small landholders, such as typically found in the Delta of Lower Egypt, the desire for participation above the mesqa-level appears to be focused on *participating* with government in the benefits of irrigation improvement and on-farm water management practices. Since only a few countries are extending management transfer to medium and large-scale irrigation systems, it is necessary to experiment with alternative management models which appear to have stronger capacity to deal with problems of accountability, such as semi-municipal water districts (governed by farmer representatives) and farmer-constituted companies.

Frequently IMT programs lack strategic planning involving all stakeholders. Strategic planning mechanisms have the potential to enable identification of new agency mandates and minimize disruptive issues such as government staff displacement. Identification of new roles for irrigation agencies after turnover, such as regulatory enforcement, water basin management and environmental regulation, can help limit agency resistance to transfer programs. In the cases highlighted in this review, WUAs were created, training was provided and physical repairs were made in conjunction with transfer. Transfer involved negotiation and agreements between the agency and water users in each case.

3 Selected Review of IMT Ownership Transfer Experiences

Time constraints did not allow for a comprehensive review of all literature available from all the countries that have reported on IMT experiences. The present study team has selected several case examples that report lessons relevant and germane to the Egyptian context.

3.1 In Argentina, for example, there was little success with transfer of small irrigation canals (i.e., 100 – 150 ha) for reasons ascribed to highly fragmented landholding patterns, absence of resource capital, inadequate maintenance, weak internal administration, and persistence of head-ender benefit predominance. Greater success was achieved by creation of larger associations through the merging of smaller systems, to create entities covering 5,000 – 15,000 ha. Each of these associations is autonomous, generates funds, established its own set of operational regulations according to the new water law. The reports suggest that that costs of irrigation have decreased, and there are significant water savings resulting from more efficient distribution (10% or more). Physical ownership of the irrigation system assets has remained with the government entities.

3.2 In Nepal, legally organized water user association on pilot scale of small and medium size with credit funds for system improvements and taking responsibilities of ownership, operation and maintenance (3,400 ha & 4,500 households) have been established. Ownership of the physical system has remained with the government, in spite of which the results on agricultural performance and consumption efficiencies have been impressive as evidenced by a generalized decrease in water loss in some Terai (southern plains belt of arable land) areas of up to 50%. In addition, farmers reported increases in both rice and wheat yields of up to 40%. The government costs of water delivery to farmers decreased by 40% to 50% in most regions, and the cash and labor value from farmers increased appreciably. Cost recovery for infrastructure improvements likewise has been excellent. Users and government attribute the positive results to an excellent planning process that incorporated a participatory approach from the outset. No activities or plans were promulgated which all stakeholders did not agree to.

3.3 The Philippines created the National Irrigation Administration (NIA) to coordinate and implement irrigation system construction and rehabilitation. A corps of irrigation extension agents was created (Irrigation Community Organizers) to act as a catalyst and provide guidance and advice. To date, management transfer has been limited largely to tertiary-level legally recognized water user associations' that carry out O&M after NIA withdraw. NIA started constructing WUAs to perform various levels of O&M (except for main storage and conveyance works) and collect service fees. (Incentives are provided for collection rates).

The turnover policy implementation began by NIA in 1980, where the system is transferred to IAs for O&M and fees collection. Irrigated area is about 1.5 m. ha (~ 20% of total cultivated area). There are three types of O&M arrangements or contracts.

- Routine maintenance
- Operation & fees collection
- Full O&M of the system

Under several donor assisted project initiatives, the NIA is planning to test a model of transferring ownership of assets to the tertiary level of the system. The National Irrigation Authority (NIA) will transfer assets and management of irrigation facilities to the concerned IA within 3 years of subproject completion. The rationale of PIMT is the expectation that ownership transfer of assets will act as an incentive for the user groups to maintain high standards of O&M and system management. Issues that need to be addressed:

- Legal justification and rationale
- Farm households cost-sharing in physical improvement
- Mobilization strategies for community participation in planning and implementation
- Determining a “new mission” for the NIA as O&M responsibilities are shifted to users

Results in many areas of the Philippines reveal improvements in water distribution equity and expansion of dry season areas under command. During the initial NIA programming phase the NIA estimated that household incomes rose by 12% after tertiary O&M transfer was implemented. The NIA also reported that fee collection rates rose from 20% to 81% between 1980 and 1990, as collection was in the hands of the users.³

3.4 In Senegal, which has a largely lifted-water system similar to that found in the Egyptian delta, an attempt was made to privatize tertiary components to user association. The associations were relatively loosely constructed and organized using a top-down approach, without a formal legal mandate. This resulted in associations dominated and controlled by influential farmers, and a pattern of “crisis” rather than routine maintenance. This misguided approach resulted further in some water savings attributed to lining and other physical improvements, almost immediate 18% expansion of area under command, and minor adjustments in cropping intensity. The irrigation system was marked by deterioration in physical infrastructure, especially the pumping sets.

3.5 In Sri Lanka, following the Philippines model, a cadre of social organizers was introduced into the irrigation personnel system structure, and gained trust of farmers, helping to organize larger groups on distribution channels. Communication between farmers and government officials improved, conflicts between farmers declined, more equitable water at the tail ends of the system, flexibility and consensus, and easing of ethnic tensions were key for project success. The policy adopted was: water infrastructure is owned by the state and managed by the

³ No such reliable data exist as yet for Egypt, including the impact of the Irrigation Improvement Project (IIP). It is the understand that KfW and the World Bank will undertake an impact assessment sometime in 2002, prior to the start-up of the second cycle of funding.

government in partnership with water users. By contrast, management turnover of distributary canals in Sri Lanka includes no water rights, only weak legal status for the WUA, no binding agreements between the agency, WUA and farmers, continuity of government staff in the scheme and a continuing supervisory and financial role for the government in O&M and rehabilitation. The modest reforms have produced no significant improvements in total cost efficiency, quality of O&M or agricultural or economic productivity of irrigated agriculture. Inspection of infrastructure indicates that farmers have been seriously under-investing in maintenance after transfer.

3.6 In the **United States**, management transfer in systems formerly governed by the US Bureau of Reclamation, included water rights, strong legal status for the water districts, formal service agreements between the government, districts and users, full transfer of authority for district finances, O&M and rehabilitation, removal of government staff from the districts and strong capacity to impose incentives and sanctions to ensure accountability. The transfer resulted in significant reductions in staff and management costs, elimination of federal bureaucratic regimes making local decision, gradual enhancements in water delivery efficiency, technical innovation and long-term improvements in the economic productivity of irrigated agriculture.

3.7 In **Tunisia**, water user associations were introduced by the French colonial government in 1913, on an informal basis. The legal status of water user associations was reaffirmed by legislation enacted in 1975 & 1977. Water User Associations and other private sector entities became increasingly involved from the mid-1980's onwards. All tube wells irrigation schemes in the south of Tunisia are now controlled by WUAs. Farmers pay for all O&M costs and have greater flexibility to respond to market demand for different crops and government help in large repairs. Ownership of the physical infrastructure remains with the public sector.

3.8 In **Colombia** about 50% of the irrigated area ($\approx 350,000$ ha) is managed entirely by the private sector. Ownership of the primary and secondary levels of the system (laterals) has remained largely with the government, except as noted below. In 1976 two irrigation districts ($\approx 40,000$ ha) were transferred to WUAs. O&M costs are covered by both fixed and volumetric charges, covering 83% of the O&M expenses, and the remainder comes from bank interest and rental of equipment. The policy of IMT to water users (WUA) started in 1980s as part of a privatization effort and general structural adjustment program intending on reducing government expenditure.

In certain regions in Colombia, where farmers had paid for the cost recovery of the construction costs, they were working the government to take over the system management and ownership. The transfer process employed a legal rule in the constitution referred to "Delegation of Administration" by which public good (here irrigation system) could be turned over to private sector entity (i.e. WUA) for administration on behalf of the state. Most farmers reported perceived increased operational efficiency following transfer and establishment of localized control units under the managerial aegis of the WUA. In addition, the quality of maintenance remained fairly stable.

What marks Colombia's experience as unique is that the economics of irrigation and agriculture were largely and positively improved, particularly in those areas where asset ownership became a responsibility of the users. For example, pre-transfer rice yields remained high, net farm income rose 23%, and the gross value of output increased 400% from 1983-91.

Significantly, for the government of Colombia, the impact on staffing levels was immediate and appreciable. The Irrigation Department reported being able to downsize its labor force by an average of 38 to 44% over the first 10 years of transfer implementation. The Colombia experience contrasts significantly with that of Senegal, where both countries implemented asset transfer mechanisms. A major reason accounting for the difference could be attributed to the level and intensity of the organizational strategy used in each: in Senegal unlike in Colombia, the WUAs were largely pro forma, or "paper" entities, lacking true representational institutional strength and structure and managerial capacity.

3.9 Mexico is usually cited in the literature as an example of where ownership transfer has met with some degree of success in terms of achieving a sustainable level of performance. The recent economic history of Mexico affirms that in a time of national financial crisis, a well-planned decision to privatize can achieve lessening of the government infrastructure burden. It should be noted that there is a general misconception among some quarters regarding how this devolution was actually managed. It is correct to state that the sudden down-turn in the Mexican economy during the 1980's and 1990's forced the government to take a hard look at some of the "millstones" it was carrying in terms of recurring infrastructure costs. With massive soft loan assistance and outright grant-in-aid from the International Monetary Fund and The World Bank, among other financial lenders, the Mexican government was able to promulgate first, a pilot effort in IMT, and later an expanded effort. It should be stressed that this "privatizing" process came with costs attached to it---it would be highly inaccurate to conclude that the Mexican government's turn-over of sectors of the country's irrigation system to users did not entail significant cost and the need for considerable technical assistance. Under the new system of management, the irrigation system is controlled by three main entities:

- Irrigation units (or WUAs, *modulos*) for small scale schemes, and run by farmers
- Irrigation Districts for large scale schemes (> 3,000 ha), and run by state
- Private irrigation schemes

The initial results demonstrate that irrigation districts receive about 30% contribution from farmers for O&M. There is a program to transfer irrigation districts to (78) large WUAs (1st stage transfer the O&M of laterals (secondary canals), 2nd stage transfer full system O&M – including main canals and water distribution). Irrigation districts will be financially self-sufficient.

Management transfer of irrigation districts to WUAs is being carried out according to legal and institutional arrangements. Capital costs and investment in public hydraulic works, are

recovered (up to 90%) of the reimbursable cost of investment. The collection from users is made semi-annually for up to 40 years. For on farm and minor irrigation network, the cost recovery is 100%. Whereas, most countries have been able to introduce transfer of smaller systems to users, Mexico, instead stressed turnover of large-scale systems.

The Mexican experiment has been supported by a revised National Water Law of December 1992. The law provides that “the commission shall accredit, promote and support the organization of users to improve the development of water resources and the preservation and control of its quality, and in order to foster their involvement at the state, regional and basin level in accordance with this law and its regulations.” The legislation calls for recovery from the private sector of public investment, and charges to user groups use of national water and national property. The legislation related to irrigation districts stipulates that an irrigation district shall include the area within its perimeter, water infrastructure, surface water and ground water, and shall be managed, operated, conserved and maintained by their users; organized under the terms of the law. In time, the district may acquire the infrastructure in an irrigation zone. The users in any given irrigation district are required to 1) use water according to district regulations, and 2) pay the fees for the irrigation services agreed to by users themselves. The law clearly stipulates that public investments in federal water infrastructure shall be recovered in the form and under the term set out in the law.

The revised legislation for Egypt’s water resources currently being approved by the Government, covers many similar procedures and issues, particularly with regard to cost-recovery and institutional development.

3.10 In the **Republic of South Africa**, organizations related to water promote the efficient use of water developed policies to charge users for the full financial costs of providing water, including infrastructure development, on an equitable basis and according to a realistic and reasonable phased program. The NWA (National Water Act) allows for the establishment of organizations that will take over water management in order to achieve the broader water policy of privatization. A water user entity can be defined along several tracks, each designed to replace the functions of state-sponsored Water Boards. Each of these entities may be established by ministerial decree upon application, and will have its own constitution and by-laws approved by the ministry. The different institutional classifications are:

- Provincial government
- Local government (e.g. municipalities, villages, townships, etc.)
- Private sector (e.g. user groups, companies, unions, etc.)

The private sector is involved as partner with the government to contribute to the implementation of the policy in various areas, including:

- Capital investment
- Operations & maintenance

- Training & capacity building
- Organizational development
- Financial and commercial services

Water services, after transfer, will be self-financing at local and regional levels (the only exception is for poor communities and townships). The system is transferred to local government once the systems are fully operational and capacity at local level is realized. Since the early 1990's many irrigation schemes previously operated and maintained by the Department of Water Affairs, have been transferred to one of the profit organization (of farmers), where performance of O&M has become more efficient.

3.11 Republic of India. Recent developments in India have seen irrigation departments there transformed from the role of *doer/implementer* to that of *enabler/facilitator*. By the mid-1990's the irrigation sector in several Indian states was in a state of crisis and major reform was called for. The state of Andhra Pradesh initiated a major overhauling of its water resource network. Following a year of consultations involving the state legislature, various government agencies, political parties, farmer groups, and the media, the Andhra Pradesh Farmer-Managed Irrigation Systems Act, 1997 (APFMIS Act) was passed by the Legislative Assembly in April 1997. Water charges were more than tripled in the same month (from Rs. 60/acre to Rs.200/acre). In June 1997, nearly 10,292 tertiary-level water users associations (WUAs) were created through a statewide election. In November 1997, 174 Distributory Committees (DCs) were created through elections. Project Committees (PCs) at the major scheme level were provided for, but remain to be established

Key features of the APFMIS Act are that it provides for:

- mandatory constitution of farmer organizations and automatic membership,
- clearly delineated hydraulic area of jurisdiction,
- empowerment to farmer organizations (FOs) to collect water charges and apply sanctions for rule violations,
- re-orientation of irrigation department staff as competent authorities to provide technical & advisory support to user organizations,
- federation of user organizations up to the scheme level and creation of an apex body at the state level.

Minimum rehabilitation works were provided as part of the project package. Training in role re-orientation was given to officials in the Irrigation and Drainage Departments, and to other designated competent authorities. Training workshops were held for WUA presidents, including interactive conferences for WUA and DC leaders at the district, regional and state levels for information dissemination, training and obtaining of feedback from farmer organization leaders. Additionally, the training and information campaign activities under the statewide *Janmabhoomi* program supported awareness about the principles of irrigation privatization reform. A basic premise of the Indian policy in Andhra Pradesh is that it is difficult for two agencies to *jointly*

manage a complex irrigation system. Over the seven year period since its promulgation, the program in Andhra Pradesh has adapted its strategy from first a) focusing on farmer organizations as a participatory tool with government, to b) user management, and finally to c) turn-over or transfer from public to private sector. While there has been a marked attitude shift in the direction of devolution and privatization, and private management, coupled with bureaucratic decentralization, the Indian state governments are still exploring which channels will achieve that end most effectively.

3.12 New Zealand is one of the few countries involved in efforts leading to complete privatization of the irrigation scheme assets. The New Zealand reform program of 1984 introduced removal of all subsidies for irrigation, including selling the schemes to users to increase the efficiency of their operation. Some of the institutional mechanisms used to promote this transformation include:

- Direct sale to irrigators
- sale to state-owned enterprise
- sale to local government
- sale to other private parties

This sell-off strategy was meant to give highest priority to irrigators, and to maximize the efficient use of irrigation assets and water resources. The sale process (for government-owned scheme including head works) was on the basis of “*as is, where is*”, and without altering the nature of water rights held by schemes. Negotiated sales agreement was reached according to schemes valuation models and arbitrations. Private sector financing was made available through the banking system and there have been no major problems with the transfer process. The government had introduced favorable conditions for the sales, and there have been few reported procedural issues emerging to threaten the sale. Except for a regulatory role and a policy formulation/implementation function, the government has almost entirely removed itself from the business of irrigation management.

3.13 In Japan, irrigation management was historically the responsibility of water users, with a limited role played by the government. Water management organizations existed at the village or village-cluster level. Following the end of World War II, Land Improvement Districts were introduced to improve land use, rice cultivation and system management and O&M performance requirements. As per the edict of the Land Improvement Law, farmers and landowners are members of the District. The governor approves the district by qualification of (15) farmers. It has played great role in enhancing agriculture production, specify in rice.

3.14 In Chile the 1981 introduction of a new water code provided for physical infrastructure, principally canals and pumps, to be transferred to users through a WUA mechanism. In a number of cases the government has turned over the infrastructure to farmers at one of three levels:

- Water User Association: secondary canals
- Canal Association: head works and main canals
- Canal Control Committee: river basin system

The Chilean water law secures water rights that are both tradable and transferable. It also provides for market allocation mechanisms within and between sectors.

3.15 In Taiwan, a complex network of user associations has led to appreciable improvements in water resource construction, improvements, and maintenance. To date, about 38,000 ha out of 500,000 ha irrigated area are managed by 17 user associations. Prior to implementation, farmers were practicing a fairly haphazard system of water management, with few controls or monitoring of user involvement. Farmers contribution to O&M have changed dramatically since the transfer process was implemented, mainly due to user management and sense of “ownership” of the system. The experience highlights the following key ingredients the transfer program:

- Strong legal and institutional framework
- Adjustments to new roles of both farmers and government irrigation agency.
- On-farm capital improvements
- Training and communication programs

Further study of this example, not possible during the brief time allocated for this current review, will yield considerable insight into the process of private sector turnover in Taiwan.

3.16 China. The IMT policy has been to transfer management on branch canal and laterals by WUAs into non-profit utilities called *Self-financing Irrigation and Drainage Districts (SIDDs)*. Some twenty pilot SIDDs have been established in nine provinces. The SIDDs sell water on to local Water User Associations, which take responsibility for allocation, fee collection, and operation and maintenance in their areas. Around 300 Water User Associations have been formed, generally registered or awaiting registration with the Civil Affairs authorities. Under the previous system, and outside of the pilot areas, farmers are usually charged for water at a fixed rate per unit of irrigated land, or on a per capita basis, with fees collected by the village committee or township officials. The Water Users Associations correspond to hydraulic units, often comprising groups of four or five villages, with no inherent conflict of interest. The WUAs elect their own officials, plan and supervise the distribution of the water so that every member gets a fair share, organize labor for repairs and maintenance of the irrigation channels, and collect fees to repay the local water board. Implementers report that after a system is established production goes up while water use and labor demand go down.

The democratic process means everyone has access to the water, so there are fewer marginalized families. The WUAs pay according to the volume of water they use, so there is an intrinsic incentive to save. Water delivered through the new boards and associations is generally priced somewhat higher than pre-transfer days. Authorities report that farmers are willing to pay a more realistic price for the water, given the advantages of reliable, conflict-free delivery with

low labor demand. Price hikes within the existing system of charging per unit of land, with no inbuilt saving incentive, would likely aggravate local conflicts and meet with considerable resistance.

4 Expectations for IMT in the Egyptian Context

4.1 Background

The result of infrastructure ownership transfer to private sector entities will be a dramatic change towards real participation of these entities as partners with the government in capital investment, financial and commercial services; cost recovery; and maintaining high standards of O&M, water delivery, socio-economic equity. Implementation of such a transfer effort would need to be undertaken in incremental steps, moving from pilot to program levels, and continually evaluating and assessing the impact and results. The complexities of Egypt's water delivery network requires that consideration be given to the various categories of system, e.g. new lands vs. old lands, gravity vs. lift systems, in addition to areas where conjunctive use and drainage water reuse are prevalent. To better appreciate the scale of the challenge Egypt faces in privatising major sections of the water infrastructure it is useful to review the following figures that indicate quantities:

Irrigation Network

- | | |
|---|------------|
| • Main Public Canals | 13,000 km |
| • Secondary Public Canals (Branch Canals) | 19,000 km |
| • Tertiary Private Watercourses (<i>mesqas</i>) | 100,000 km |

Drainage Network

- | | |
|-----------------------------------|------------|
| • Main Drains | 17,500 km |
| • Open Secondary Drains | 4,500 km |
| • Covered Secondary & Tile Drains | 250,000 km |

Together, these systems service a command of about 7.4 million feddans. Implementation of a transfer scheme would necessitate a careful phasing, in order that the process and range of impacts can be monitored and analysed. It should be readily apparent that the prospect of transferring the entire infrastructure to private control and ownership is daunting and costly.

The Pros:

- ❑ Sense of local control and ownership is inculcated in user psychology and behaviour
- ❑ Lower financial burdens for government
- ❑ Locally-managed mechanism for capital sector recovery and fee collection
- ❑ Improved O&M, equity and system management
- ❑ Adjustments & new roles for both farmers and government agencies

- ❑ Decentralization and devolution of responsibility and authority

The Cons:

- ❑ Reluctance to take on the government responsibility
- ❑ Time and resources needed for capacity building
- ❑ Some systems need rehabilitation before transfer
- ❑ Need for well-inculcated legal and institutional framework.

The rationale for transfer has both “push” and “pull” dimensions. The push comes from government financial and administration burdens. The pull comes from attractions of stimulating other partners, and attraction of decentralization.

Asset ownership transfer will need to be supported by a strong legal foundation and a resilient institutional framework that fosters adjustments to new missions and roles of governmental and other relevant entities. Below, is a brief review of existing laws and laws currently in revision.

4.2 Law 12/1984 on Irrigation & Drainage

Public utilities/domains and ownership of property of the irrigation & drainage system are defined in Article 1, and are explicitly restricted to the MWRI. The law however does provide for entrusting this responsibility to other governmental body, including public authorities and local units (Article #4).

Water management and system O&M on public canals are done by MWRI.

4.3 Law 203/1991 on Companies of Public Sector Enterprises

One of the options for private sector water infrastructure ownership is through the contracting of a private company. This Government of Egypt law provides the guidelines for establishment of holding companies on the basis of governmental decree. This option, yet to be approached in Egypt on a practical basis, would be subject to the following terms and conditions as proscribed by the Law 203/1991:

- The holding company takes the form of stock company having a clearly defined legal status.
- The holding company invests its own funds through subordinate companies, in accordance to the state policy and has the rights of buying and selling stocks.
- The capital fund of the holding company should be distributed (divided) into equal shares.

In terms of water resource privatisation, the implications of this law need further study. It may then be appropriate to carefully craft pilot effort to privatize a discrete sub-section of the irrigation system under the provisions.

4.4 Initial Model for Implementation of Ownership Transfer

It is generally acknowledged that adjustments to roles, mandates and mission for MWRI agencies and the WUAs are required. The concept of irrigation system privatization no longer is a frightening prospect, as the Government of Egypt has launched such similar efforts in many other sectors of the Egyptian economy. It does remain, however, a daunting prospect, as a shift from public to private sector control must be conducted in accordance with government policies and procedures, and always with a vision toward crafting a structure that can be economically self-sustaining.

Even within the Ministry of Water Resources and Irrigation there is considerable discussion at this stage of privatising other entities, such as drainage pipe manufacturing.

This process has its costs, and they will need to be weighed and valued at all stages. These costs, which have yet to be accurately estimated for the Egyptian context, relate primarily to capacity building efforts, training and communication to an audience heretofore unfamiliar with the processes. Given these major costs and the limited resources available, it is logical and responsible to work toward water resource privatization in areas most likely to be receptive and ultimately, successful in the short-run. To this end, reclaimed land schemes (both old and new) should be given priority for ownership transfer. The two recently established holding companies for North Sinai, Toshka and Western Delta would be an opportune launching pad for the process.

“Old land” and their corresponding infrastructure should be conceived and processed in an evolutionary manner until the concept of *Integrated Water Management District* that would be eventually transferred to users is realized.

The most appropriate situations at this time for application of a system of ownership transfer are those prevailing with “new” and/or “old-new” irrigated land already developed or planned for development. These irrigated areas are located on the fringes or the extension of the eastern and western Delta and the Nile Valley (e.g. El-Salaam Canal Project, the Salheya Shabab projects, Western Nubareya, and Northern Coastal Roads region, and Toshka Project in upper Egypt).

Due to the complexity of the system, predominance of fractionalised landholdings, prevailing social and cultural conditions in the old land of Nile Delta and Nile Valley, the transfer would be best likely limited for the foreseeable future to turn-over for O&M responsibilities. In certain cases the current pilot program on Integrated Water Management District (IWMD)⁴, which is

⁴ IWMD is a long-term goal to reorganize internal MWRI functions and operations through a process of local consolidation and ministry-wide decentralization, including devolution of authority to the local or district level.

expected to result in an effectively streamlined and more efficient support and service mechanism, may be able to play a key role in private sector ownership transfer to user entities.

In the following sub-sections of this chapter of the report there is a review of the primary features of each of the major endeavours currently underway to expand or improve the water management network in Egypt. It is appropriate to review each of these projects or initiatives in terms of likely candidacy for water resource asset infrastructure ownership transfer.

4.5 El Salaam Canal Project

El Salaam is a land reclamation project with an area of 620,000 *feddan* located in the northern part of the East Delta and Sinai peninsula. Water is supplied to El Salaam in the eastern section and Sheikh Gaber in the western section from the Damietta Nile branch. The canal extends westward along 87 km. to the Suez Canal, where it crosses the canal by siphon channels, and continues in a westerly direction along the northern desert area of the Sinai, i.e. another 175.0 km from Suez Canal to the tail. The canal is fed by water from Nile and treated agriculture drainage outflows by a ratio of 1:1. The canal is operated through a highly mechanized network of lifting pumping stations and other hydraulic control structures. The project area is divided into sub-areas, delineated and demarcated according to topography & soil classification. There are 5 sub-areas in the west and 6 sub-areas in the East.

Land is allocated to a broad range of categories ranging, from small farmer, to big investors and companies, according to certain criteria established and approved at the cabinet-level by the Government of Egypt. Most of the system infrastructure in the East has been established, and land is presently under development. A great deal of the conveyance system is the Western part is in place, while the remainder is under construction. The cost of the main system infrastructure is estimated to be about 5.6 billion LE, inclusive of communication, community services, power supply, and transport infrastructure. The GOE will need to find creative solutions to the challenge of running and operating this system.

In realizing the abovementioned challenge and considering the approach of transferring parts of the government assets and responsibilities to the private sector, a Presidential decree (No.24/2002) was issued to establish a new holding public company for North Sinai Development, also in accordance with Law 203/1991. This holding company will replace the North Sinai Executive Authority. The company will have the following rights and obligations:

- Transferred land and infrastructures and other assets of the Authority. Special committees as a part of capital fund are evaluating the assets.
- The company is authorized to establish subsidiary companies (stock companies) and to place or float shares on the open international market.

Under this IWMD model operational and administrative management of services would be coordinated under the auspices of the District Engineer.

- The private holding company will have all rights, duties and/or obligations previously enjoyed by the Authority.
- The company will be self-sustained financially and administratively.

The Authority will be replaced by a small department with truncated roles and mandates, primarily in the arenas of monitoring, regulatory control and enforcement. The MWRI will retain ownership only of the main national infrastructure (e.g. Sheikh Gaber canal and its hydraulic structures). However the MWRI may decide to contract with the private holding company for the management and O&M of these national infrastructures in return for charges collected from consumers and users.

This project represents a **major forward leap** toward enhanced roles for the private sector, ownership transfer, and eventual government withdrawal.

4.6 Toshka Project

Toshka, like El Salaam, is also a major land reclamation project of area 540,000 feddans located on the west side upstream from the High Aswan Dam. The project is currently under construction, and the inauguration for the first phase is planned for October 2002. The project is comprised of:

- Main carrying canal – 50.0 km length.
- Two subsidiary canals feeding four branch (secondary) canals No. 1, 2, 3 & 4 (each has a command area of about 100 – 150 thousand feddan).
- The master or main lifting pump station to lift Nile water to the Main canal.
- Other hydraulic structures, and related project facilities.

The command land areas of branches Nos. 1, 2 & 4 were allocated and sold to private or private/public entities, which will be responsible for land development and the required infrastructure implementation, O&M and system management. The owners will pay fees for irrigation services provided the government agency (per feddan and water volume). Branch No. 3 implementation costs were granted by the Abou-Zabia fund (~ US\$ 100.0m). The total project costs of the main and basic infrastructure will be in the range of 6.5 – 6.0 billion LE

4.7 Project Future Management Strategy

- Land and system below the Toshka branch canals (Nos. 1, 2, & 4) will be the responsibility of the landowners.

- Presidential Decree 25/2002 was issued to establish a holding company for this project, along with two additional planned reclamations projects in North-West Delta (100,000 feddan) and along the North Coastal Road (230,000 feddan).
- The holding company will have similar rights, obligations, responsibilities and mandates as for that previously mentioned for the North Sinai project. It will have the business and investments for:
 - Developing and or selling lands
 - Managing, operating and maintain the irrigated lands system, in return for charges paid by the consumers/shareholders/beneficiaries
 - Invest in own irrigated agriculture and other related activities and products.
 - The company will be financially and administratively self-sustaining

4.8 Other Projects and Schemes

A number of schemes have been implemented and managed by government agencies. In some the government is even managing the irrigated lands. Examples and models for those projects are:

- In Eastern Delta
 - New Salheyia project (190,000 feddans) system and land development were poorly implemented. Resources were misused and productivity consequently is low.
 - Old Salheyia project (23,000 feddan) land system is run by the government. Financial running costs for O&M are very high and productivity is low.
 - El-Shabab old project (33,000 feddan) was sold to a private sector concern that is suffering from major management and productivity problems, lack of experiences, skills and funds.
 - New El-Shabab project (22,000 feddan). The main and basic infrastructures (pumps, canals and water storage) were implemented and are run by the government. Land and related system development and production are progressing slowly and inefficiently.

The schemes cited above need to be revised by involving private or public private or empowered civil societies to take-over the system for improved management. Farmers and other entities should participate.

4.9 Western Delta

There are more than 100,000 feddans, in both North and South Tahrir, of old-new reclaimed lands that were out-fitted with canals, pumps boosters, etc. for pressurized irrigation 20-40 years ago. The system is in need of major rehabilitation and improvement. Farmers need an improved management system by organizing themselves into empowered organizations or contract private or public/private entities. Under APRP it was demonstrated how one of these branch canals in South Tahrir could be successfully re-moulded into an effective user power-base for such rehabilitation and improved system. This will in result in higher productivity and increased capacities to pay for system improvement and O&M.

4.10 Other Projects in the Reclamation Plan Ending in 2017

Consideration should be given from the outset for involving the private sector in implementation and system management facilities, as well as incentives in land allocation. Old reclaimed land, largely dependent on groundwater aquifers (tube wells) and related infrastructure in North Sinai, and in the major oases of the Western Desert should be trial-tested for ownership transfer and management by users and consumers. For the old land of the Nile Delta and Valley, where landholdings are very small and farmers' resources limited, it makes the most sense initially to contract with private sector management entities utilizing the *Integrated Water Management District* as the focal point for management implementation. Intensive application of the IMT Monitoring and Evaluation plan will enhance the process and provide analysis essential for future planning.

5 A Strategic Model for Ownership Transfer in Egypt (SMOTE)

5.1 Background

The strategy proposed below is based on the results from benchmark achievements in APRP (1997-2002) and on the analysis ascertained from reports and studies in several other countries. In new, old-new and later in old lands, and based on the results ascertained from reports and studies in several other countries, it is recommended that MWRI will transfer management of irrigation facilities to the concerned BCWUA according to a negotiated mutually agreed time frame and plan of action, ranging from 2 to 4 years, depending on internal capabilities.

5.2 Strategic Model and Process

Under the SMOTE model, proposed herewith, ownership rights in the system are handed over to a users' organization (In this regard, the term "organization", is left more general, in order to allow for flexibility according to the type of entity, including private holding companies). On full system implementation, the role of the government irrigation authority shrinks to offering a BCWUA some technical support, perhaps even on a fee for services basis. Otherwise, after a 3-year apprenticeship under MWRI tutelage, a BCWUA achieves and demonstrates full capability in managing and sustaining its irrigation facilities. Under PIM and IMT programs that we know of, including Egypt, a government irrigation authority simply decentralizes control over irrigation and enlists farmer participation in O&M to varying degrees but retains ultimate legal ownership and authority over the system.

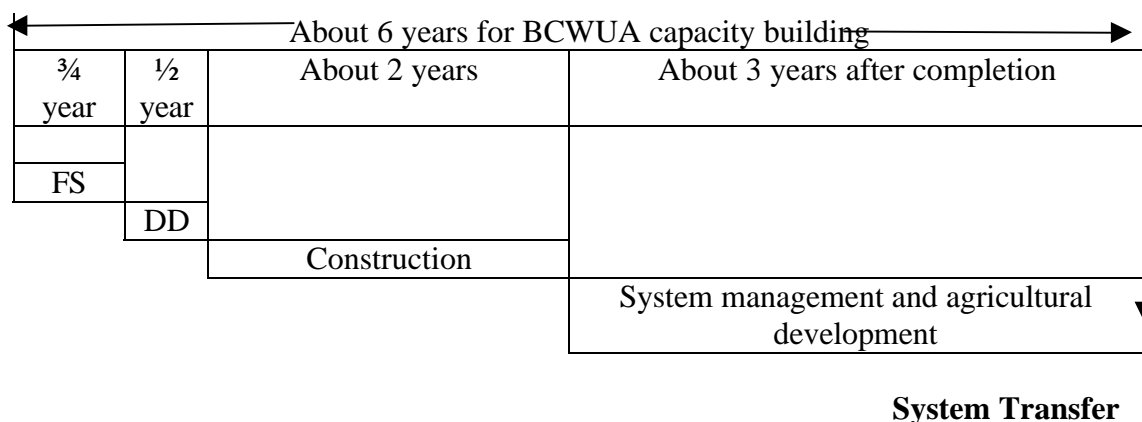
Until only a few years ago, the process of developing WUAs has been mainly top-down and overly focused on the WUA leadership. As part of the IMT program under APRP, a methodology was introduced that generated leadership and building of local irrigation institutions from the bottom-up. The results, although very satisfactory, could be enhanced through maximizing gender awareness and participation of women members of the community (cf. results of 2001 KAP Survey), establishment of internal and external audit committees for technical, financial and social audits. Members would serve on audit committees for auditing their own BCWUA and some would participate in auditing of other BCWUAs.

There is a need to have market-based initiatives for creation of sideline businesses related to irrigated agriculture which could be taken up by BCWUA members, but organized under a separate unit. Private irrigation districts in the US, New Zealand, Mexico have been able to defray major O&M costs through this mechanism. By using a SMOTE method as suggested here, BCWUAs could, using existing regulations and mechanisms, maximize their resource base.

MWRI, consistent with the internationally accepted principles of *participatory irrigation management* (PIM), has hitherto focused its institutional development efforts on a transfer of costs and responsibilities from MWRI to BCWUAs. It has focused its formal training efforts on BCWUA officers. SMOTE would be championing a change in MWRI emphasis. Rather than

transfer of costs and responsibilities, SMOTE promotes transfer of benefits and the authority of ownership. Rather than training BCWUA officers exclusively, there is proposed a cascading system of hands-on training whose objective is mass-based participation of all stakeholders who are direct beneficiaries.

Figure 2: the Participatory Irrigation Asset Transfer Process



FS = Feasibility Study
DD = Detailed Design

Under this proposed SMOTE structure, each sub-section of the irrigation or drainage system to be transferred would undergo a similar strategy and process, as described below:

➤ The **Feasibility Study Phase** begins with a Community Orientation activity, which presents the proposed concept of transfer to the target community. SMOTE stresses the importance of enlisting participation of the mass of stakeholders from the outset. Organizational efforts of the Feasibility Study Phase thus would focus on the field or turnout service area level. The key deliverable of the Feasibility Study Phase is a technically viable feasibility study that meets the needs and has the formal endorsement of each concerned BCWUA, its subsidiary mesqa-level WUAs, and a Federation of BCWUAs, as appropriate. The Feasibility Study Phase ranges through several organizational, information gathering and participatory activities whose collective objective is to engage community participation in determining the parameters of the irrigation system. PRA (Participatory Rural Appraisal) tools are expected to be very effective in this regard. The Feasibility Study Phase culminates in community review and endorsement of the draft feasibility study. It is estimated that approximately 8 or 9 months to complete the Feasibility Study Phase in large command areas.

➤ The **Detailed Design Phase** follows the Feasibility Study Phase. One important output of the Detailed Design Phase is formal organization of a BCWUA to group WUAs that are sharing a common branch canal. Another important output is a detailed subproject design undertaken by

participation of the membership of the concerned BCWUA. The Detailed Design Phase culminates in a subproject Memorandum of Understanding (MOU), which MWRI and concerned BCWUAs sign in order to document a mutual understanding of the nature and scope of the subproject including the BCWUA commitment to its equity share contribution. The Detailed Design Phase is expected to last about 6 months, again depending on local exigencies and technical requirements.

➤ The duration of the **Construction Phase** may be highly variable, depending on the size of the system and the complexity of the works involved. The main output of the Construction Phase is an irrigation/drainage system built, as far as possible, through labor-based methods. Use of labor-based methods plays a key role in the ability of BCWUA membership to generate their equity share contribution for the work. BCWUA members who participate in the construction workforce pass part of their income back to the BCWUA as their share of the equity cost contribution.

➤ The final phase of SMOTE is **System Management and Agricultural Development**. This phase may last for up to 3 years from the end of construction and the commissioning of the works. During the System Management and Agricultural Development Phase the IAS will mentor each BCWUA through an apprenticeship program of on-the-job training in management of the irrigation system. The IAS will also make technical assistance available to the BCWUA in various areas, particularly in collaboration with agricultural development extension entities.

Systems Transfer is the milestone that recognizes the BCWUA as a viable organization. System Transfer will mark the end of the System Management and Agricultural Development Phase. We anticipate System Transfer at approximately 6 years after commencement of the system feasibility study. At that point, the BCWUAs sharing a system should have demonstrated their managerial capabilities and should be exercising their O&M responsibilities satisfactorily. MWRI will then transfer management responsibility as well as physical assets to BCWUAs or federations as appropriate.

Following Systems Transfer all categories of beneficiaries will assume the responsibility of covering the negotiated costs of operating and maintaining their physical infrastructure. They will have to set their own fee structure internally so that they are ready to cover the costs of emergency repairs in addition to the costs of routine O&M. They will also have to make provision for collection of the fees that they set. MWRI will remain a source of technical assistance and follow-up training but the BCWUA will otherwise take full charge over day-to-day operations of the system.

5.3 System of BCWUA Training and Informed Collective Decision-Making

The SMOTE approach to BCWUA capacity building emphasizes on-the-job training and informed collective decision-making. One challenge of SMOTE will be to develop a cost-effective approach to training that *maximizes the flow of information* among participants. The

principle of the system is that trainees at the BCWUA level become trainers at the WUA level. This would allow IAS and other MWRI staff to focus their direct efforts on training at higher levels of user organization. They at the same time prepare Federation of BCWUA personnel to conduct the same small group activities and on-the-job training exercises with BCWUA personnel.

The cascading system is, at the same, a mechanism for providing information flows and feedback from lower to higher levels. Many group activities include collection of information that feed into water management decision-making. In the process of carrying out any exercise, the facilitator gathers valuable information and points of view that feed into exercise of his or her role in the next higher level of the pyramidal structure. The critical system incorporates an approach that assures that personnel at the next higher level are well informed about the observations, insights, concerns and constraints at the next lower level.

The hierarchical strategy system is proving a cost-effective strategy to diffuse information among subproject beneficiaries. A relatively small number of MWRI staff is thus able expeditiously to convey a body of information to up to several thousand farm household decision-makers. The objective is to equip beneficiaries to make informed decisions concerning their collective interests.

5.4 User Review and Endorsement of Each Subproject Feasibility Study

Community Review and Endorsement of the draft feasibility study report is the targeted milestone farmers' participation in the Feasibility Study Phase of the SMOTE process for non-core subprojects. It is a precondition for subproject approval. Community Review and Endorsement provides a medium for farmers to assess the responsiveness of the proposed subproject to community needs as identified in mobilization activities earlier in the Feasibility Study Phase. A favourable outcome of BCWUA Review and Endorsement means informed acceptance of a proposed subproject scope and cost by farmers. It includes acceptance of their roles and responsibilities, for the principle of proportional water rights for all farmers in the service area and for their equity contribution to the cost of construction.

The main purpose of BCWUA Review and Endorsement is to involve all target groups in an informed collective decision-making process to determine the community's acceptance of or proposal of modifications in the results of the planning process. Specifically, BCWUA Review and Endorsement achieves the following objectives:

1. to assist local shareholders in assessing whether a proposed activity is responsive to their water management/agricultural development priorities as formulated during mobilization activities;
2. to enable these communities, and particularly disadvantaged groups such as women, and the poor, in coming up with a decision whether the proposed scope and cost estimates,

farmers' equity contribution to the cost of construction or rehabilitation of the irrigation system and proportional allocation for all farmers within the service area as envisaged are acceptable; and

3. to engage these communities in defining roles and responsibilities for cost effective implementation of irrigation construction/rehabilitation and sustainable management of the irrigation system.

5.5 Participatory Planning of Facilities

The rationale for Participatory Planning of Facilities is to eliminate the discrepancy between designed service area and actual service area, to avoid construction of unplanned structures by users during system operations and to eliminate construction of farm ditches that farmers subsequently abandon. Under the SMOTE process Participatory Planning of Facilities will take place early in the Detailed Design Phase of the project. It will be a vehicle for farmers to participate in the actual planning and design of terminal facilities. Practical application of design concepts will be demonstrated to ensure the cascading system of on-the-job training for farmers.

MWRI will go a step beyond earlier approaches to irrigation project development and system management in the Egypt. The concept of SMOTE is a signal departure from earlier concepts of participatory irrigation development. The key element in the SMOTE concept is to hand over both management and assets of a completed irrigation system from the government irrigation authority to a non-government BCWUA. Such an approach is more akin to actual privatization of irrigation systems than to the simple devolution of management that has hitherto characterized MWRI institutional development under the umbrella of IMT. MWRI expects effective user participation in system management buttressed with MWRI support for building self-reliant BCWUAs capable of post-transfer system O&M to have significant positive impact on sustainable irrigation system performance. This should in turn lead to increased irrigated agriculture production and higher farm household incomes.

5.6 A Final Word for Consideration

In order to effectively address the issues inherent in SMOTE, MWRI will need to address several major issues in order to establish and maintain a positive trajectory:

- First and foremost, under what provisions in Egypt legal codes is MWRI entitled to dispose of government assets to private entities such as BCWUAs? How can the apparent conflict between MWRI strategy and the requirements of the Ministry of Finance be resolved regarding transfer of assets to local government units, private holding companies or to BCWUAs?

- In order for farm households to follow through on their commitment to equity contribution and amortization payments for irrigation infrastructure what assurance will they require that the irrigation system will generate an income increment more than sufficient to cover their incremental costs of production?
- Whither MWRI? As a direct consequence of water management devolution or privatization, will MWRI lose its mission and simply wither away? Or will MWRI reformulate its mission into provision of technical and managerial services on, perhaps, a fee for services basis. In the interest of sustaining operations, BCWUAs will need technical and managerial services that exceed the capabilities of their membership. Will BCWUAs be willing to hire MWRI or former MWRI staff to perform these services? Will the incremental revenues justify the expense of MWRI provision of contract services? Will MWRI then gradually evolve into an irrigation services provider that offers technical and managerial support to autonomous irrigation districts that operate on, say, the model of those in China, Chile or the western United States?

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